

ABSTRACT OF THE DISCLOSURE

The light collimating plate includes a lens substrate, a plurality of microlenses disposed on a surface of the lens substrate, a plurality of light entrance areas, each having a circular or rectangular form a center of which is on an optical axis of the microlens, and a light shield layer formed on another surface of the lens substrate, and covering other area than the light entrance areas. When n and t are a refractive index and a thickness of the lens substrate, respectively, and C (R ; diameter, A , B ; sides of rectangle) is a size of light entrance area, a size of the microlens S_r satisfies the following formula in the light collimating plate: $S_r \geq 2t \times \tan\theta + C$ (with the proviso that $\theta = \sin^{-1}(1/n)$). Or, a form of the microlens in the light collimating plate is a part of an ellipsoid shown in the following formula $X^2/a^2 + y^2/a^2 + z^2/c^2 = 1$ (x and y represent axis on the surface of the lens substrate, z represents the optical axis), it's accentricity ϵ is shown in the following formula $\epsilon = (c^2 - a^2)^{1/2}/c = 1/n$ and it's far focal point is on a position of the light entrance area. The lighting apparatus and the liquid crystal display apparatus use the light collimating plate.

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